Exploring the Role of Received Peer Feedback for Students' Learning Outcomes in Online Higher Education

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Abstract: In this article, we aim to explore the differences in the received peer feedback among successful, less successful, and unsuccessful students in higher education. This exploratory study was conducted in online settings and in the context of argumentative essay writing. In total, 135 undergraduate students participated in an online module and they completed three tasks in three consecutive weeks. In the first week, they wrote an argumentative essay. In the second week, students provided two sets of feedback on their peers' argumentative essays based on the given criteria. In the third week, students were requested to revise their argumentative essay based on the received feedback. Students' success was defined based on their improvements from the original essay to the revised essay. The results showed that unsuccessful and less successful students received more affective and descriptive feedback from their peers compared to successful students. The findings of this study provide practical implications on how peer feedback approaches should be implemented to help students write better argumentative essays in online learning environments.

Keywords: Argumentative essay writing, Higher education, Online learning, Peer feedback

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Introduction

Writing a good argumentative essay is a crucial skill for university students (Akhteh et al., 2022; Noroozi et al., 2012; Valero Haro et al., 2022). A high-quality argumentative essay should include a clear introduction, a position that is supported by arguments and evidence, followed by presenting counter-arguments against the

position, and a response to the counter-arguments against the position, which could lead to a conclusion on the issue (Noroozi et al., 2016; Noroozi, 2018; Noroozi et al., 2020). In real educational settings, It is challenging for students to perform well and include all elements of argumentative essays in their report (Fan & Chen, 2019; Ferretti & Graham, 2019; Noroozi, 2022).

In the literature, peer feedback is found to be a successful learning strategy in higher education to enhance students' argumentative essay writing skills (e.g., Latifi et al., 2020, 2021; Latifi & Noroozi, 2021; Noroozi et al., 2011, 2016; Taghizade et al., 2020). For example, Latifi and Noroozi (2021) showed that supported peer feedback enhances students' argumentative essay writing quality. This supported peer feedback guided students to encourage in the learning process by allowing them to review the quality of peers' essays, discover gaps in their essays, and suggest improvements based on the given criteria (Latifi et al., 2021; Lizzio & Wilson, 2008; Noroozi & Hatami, 2019). However, providing high-quality peer feedback is also a challenging task for students especially for argumentation tasks that demand high level of cognitive processing. Some students lack knowledge of feedback, and others simply cannot translate this knowledge into practice (Latifi et al., 2021; Noroozi et al., 2016). A review of prior studies reveals that the success of feedback mainly depends on its quality (Kerman et al., 2022; Carless et al. 2011; Er et al., 2021; Taghizadeh Kerman et al., 2022). Effective feedback should include elements like affective statements (such as compliments or praise), a brief overview of the work, identification and localization of the problem(s), solutions to the problem(s), and action plans for future improvements (Lu & Law, 2012; Patchan et al., 2016; Wu & Schunn, 2021). Students normally reject comments that do not include high-quality feedback elements (Dominguez et al., 2012; Patchan et al., 2016; Wu & Schunn, 2020). This may results in a lack of uptake of the feedback and as a result the whole feedback process may be considered as ineffective.

According to the literature, few studies have attempted to examine the effects of the quality and features of the received peer feedback on students' uptake of peer feedback in the learning processes and outcomes (e.g., Misiejuk et al., 2021; Nelson & Schunn, 2009; Wu & Schunn, 2020; 2021). The literature provides little evidence on how features of received peer feedback can influence students' performance, particularly in the context of argumentative essay writing in online settings. This study was conducted to further explore and address these issues by answering the following research question:

What are the differences in the features of received peer feedback among successful, less successful, and unsuccessful students in the context of argumentative essay writing in online settings?

Method

Participants

In this study, 135 undergraduate students participated, however, only 101 students completed the module. About 69% of participants were female (N = 70) and 31% of participants were male (N = 31). To comply with ethical

considerations, participants were informed about the research setup of the module. They were assured that no data could be linked to any individual participant. Furthermore, ethical approval from the Social Sciences Ethics Committee at Wageningen University and Research was obtained for this study.

Procedure

A module called "*Argumentative Essay Writing*" was designed and embedded in an online learning platform called Brightspace in the selected course. The module was followed for three consecutive weeks, and in each week, students performed one task. In week one, students were invited to write an argumentative essay on one of the three offered topics (task 1). In week two, students were requested to provide feedback based on the criteria embedded in the platform on two argumentative essays of their peers (task 2). In week three, students were asked to revise their essays based on the feedback sets they received from their peers (task 3).

Measurements

Quality of Students' Argumentative Essay

In this study, a coding scheme developed by Noroozi et al (2016) was used to analyze the quality of students' argumentative essays. This coding scheme was developed using the elements of high-quality argumentative essay writing (e.g., Noroozi et al., 2016; Toulmin, 2003), including eight elements: (1) introduction on the topic; (2) taking a position on the topic; (3) arguments for the position; (4) justifications for the position; (5) arguments against the position; (6) justifications for the position; (7) response to counter-arguments; and (8) conclusion and implications. The coding scheme is scored from zero (the lowest quality level) to three (the highest quality level) for each element.

All the points obtained by students for these elements were summed up together and indicated the students' overall scores for the quality of the written argumentative essay. Students' argumentative essays were assessed in two steps: the original argumentative essay and the revised essay. Cohen's kappa coefficient analysis was used to measure the inter-rater reliability between the coders, and the results showed that there is a reliable agreement between the coders (Kappa = 0.70, p *0.001*).

Quality of Students' Received Peer Feedback

The authors developed a coding scheme to assess the quality of students' peer feedback based on a review of relevant recent studies (e.g., Nelson & Schunn, 2009; Patchan et al., 2016; Wu & Schunn, 2020). This coding scheme analyzes the features of peer feedback, which includes three elements: (1) affective, (2) cognitive (description, identification, and justification), and (3) constructive. The features of this coding scheme were scored from zero (poor quality) to two (good quality).

All the given points were summed up and represented the students' overall score for the quality of their received

peer feedback. Since each student received two sets of feedback, the average score from the two sets of feedback was considered as the overall score for the quality of the received peer feedback. Similar to the argumentative essay analysis, the same two coders participated in the coding process for peer feedback analysis, and Cohen's kappa coefficient results for inter-rater reliability among coders were found to be significant (Kappa = 0.60, $p < 0.001$).

Analysis

In this study, we first controlled the effects of gender on the relationship between the independent grouping variable and the continuous dependent variables. Second, we used a percentile rank measurement to categorize students into three groups: Successful (students whose progress in argumentative essay writing from pre-test to post-test was higher than 67th percentile) (N = 34, 34%), less successful (students whose progress in argumentative essay writing from pre-test to post-test was between 33th to 67th percentile) (N = 23, 23%), and unsuccessful students (students whose progress in argumentative essay writing from pre-test to post-test was between less than 33th percentile) (N = 42, 42%).

Then, the MANCOVA test was conducted to compare the differences in the quality of received peer feedback features among the successful, less successful, and unsuccessful students. Since the sample sizes were unequal, we used the Tukey-Kramer test to determine the pairwise comparisons. In addition, the Levene test showed that the groups were homogeneous and the Kolmogorov-Smirnov test showed that the data were normally distributed ($p > 0.05$). Also, Box's Test of equality of covariance matrices showed that the observed covariance matrices of the dependent variables are equal across groups (Box's M = 38.42, F(30, 18426.45) = 1.17, p = 0.23).

Results and Discussion

What are the differences in the features of received peer feedback among successful, less successful, and unsuccessful students in the context of argumentative essay writing in online settings?

The results showed that unsuccessful, less successful, and successful students differed in terms of mean scores of their received peer feedback quality (Wilks' Lambda = 0.82, F(10, 182) = 1.86, $p < 0.05$, Partial $\eta 2 = 0.09$). This difference was mainly due to the affective and descriptive features of feedback. Unsuccessful students received more affective and descriptive feedback than successful students. Less successful students received more affective and descriptive peer feedback than successful students (see Table 1).

This study found that students' success in writing argumentative essays is significantly influenced by the type of feedback they receive. According to this study, students should be encouraged to provide more cognitive and constructive comments than affective feedback to perform well in writing argumentative essays. Students often tend to give more affective feedback, despite the efficiency of the cognitive and constructive comments. This

suggests that teachers should encourage students to give more complex forms of feedback. These findings are consistent with and supported by previous research indicating that the effectiveness of peer feedback depends on its type and features (see Carless et al., 2011; Taghizadeh Kerman et al., 2022; Wu & Schunn, 2020).

Table 1. Differences among Successful, Less Successful, and Unsuccessful Students in Terms of Mean Scores for Received Peer Feedback Quality

Variables		Group	Received peer feedback quality		Pairwise comparisons	Difference among unsuccessful, less successful, and successful statistics
			Mean	SD		
Affective		Unsuccessful	1.66	0.17	Successful< Unsuccessful *	F (2, 95) = 4.27, p < 0.05*, Partial η2 = 0.08
		Less successful	1.70	0.17	Successful< Less successful **	
		Successful	1.57	0.14		
		Total	1.64	0.17		
Cognitive	Description	Unsuccessful	1.40	0.28	Successful< Unsuccessful *	F (2, 95) = 3.91, p < 0.05*, Partial η2 = 0.07
		Less successful	1.44	0.32	Successful< Less successful *	
		Successful	1.22	0.36		
		Total	1.35	0.33		
	Identification	Unsuccessful	0.67	0.29		F (2, 95) = 0.33, p = 0.71
		Less successful	0.69	0.29		
		Successful	0.73	0.39		
		Total	0.69	0.32		
	Justification	Unsuccessful	0.02	0.04		F (2, 95) = 2.75, p = 0.07
		Less successful	0.04	0.06		
		Successful	0.06	0.08		
		Total	0.04	0.06		
Constructive		Unsuccessful	0.78	0.36		F (2, 95) = 0.50, p = 0.60
		Less successful	0.76	0.31		
		Successful	0.84	0.41		
		Total	0.80	0.36		

(P<0.01)**, (P<0.05)*

Future research should compare the effects of the provided and received feedback elements on students' performance in writing argumentative essays. This can give insight into the roles that the assessor and assessee play in the feedback process and how it affects how well students perform in writing essays for higher education.

Conclusion and Recommendations

This study adds to our understanding of the peer feedback process and performance of students and sheds light on the differences among successful, less successful, and unsuccessful students in their peer feedback performance for writing argumentative essays. This study highlights the importance of high-quality feedback in the success of writing argumentative essays. Based on this research, it is necessary for students to be sufficiently trained and encouraged regarding the elements of high-quality feedback and how to provide it, especially providing cognitive and constructive feedback.

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